UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,035	12/04/2003	Vladimir Vitalevitch Ivanov	081468-0307072	4850

909 7590 07/12/2005

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

EXAMINER	
QUASH, ANTHONY G	
ART UNIT	**PAPER NUMBER**
2881	

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/727,035	IVANOV ET AL
	Examiner	Art Unit
	Anthony Quash	2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/4/05 (amendment filed)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 8,15,16 are rejected under 35 U.S.C. 102(e) as being anticipated by Ahmad [6,881,971]. As per claims 8,15, Ahmad [6,881,971] discloses an illuminations system and method for providing a beam of radiation, the illumination system comprising; a radiation-production system that produces extreme ultraviolet radiation, wherein particles produced as a by-product of extreme ultraviolet radiation production move substantially in a particle movement direction; and a radiation-collection system that collects the extreme ultraviolet radiation, the radiation which radiates in a collection-direction the collection-direction being substantially different from the particle-movement direction. See Ahmad [6,881,971] abstract, figs. 1-3, col. 1 lines 15-45, col. 2 lines 15-60, col. 3 line s1-35, 49-67, col. 4 lines 25-65,, col. 5 lines 1-35, and col. 6 lines 1-10, 30-35.

As per claim 16, Ahmad [6,881,971] discloses generating an electric field along the particle movement direction. See Ahmad [6,881,971] figs. 1-3, col. 2 lines 20-50, and col. 4 lines 25-65.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1,2,4-5,7,9,11-12,14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kandaka [6,590,959] in view of Ahmad [6,881,971]. As per claim 1, Kandaka [6,590,959] teaches an lithographic apparatus comprising an illumination system that provides a beam of radiation, a support structure (513) that supports a patterning structure (508), the patterning structure configured to impart the beam of radiation with a pattern in its cross section, a substrate support (514) that supports a substrate (511), and a projection system that projects the patterned beam onto a target portion of the substrate. See Kandaka [6,590,959] abstract, figs. 1,3-5. However, it does not explicitly state the illumination system comprising a radiation-production system that produces extreme ultraviolet radiation, wherein particles produced as a by-product of extreme ultraviolet radiation production move substantially in a particle-movement direction, and a radiation collection system that collects the extreme ultraviolet radiation, the radiation collection system being arranged to collect extreme ultraviolet radiation which radiates in a collection direction, the collection direction being substantially different from the particle movement direction. Ahmad [6,881,971] does teach the illumination system comprising a radiation-production system that produces extreme ultraviolet radiation, wherein particles produced as a by-product of extreme

ultraviolet radiation production move substantially in a particle-movement direction, and a radiation collection system that collects the extreme ultraviolet radiation, the radiation collection system being arranged to collect extreme ultraviolet radiation which radiates in a collection direction, the collection direction being substantially different from the particle movement direction. See Ahmad [6,881,971] abstract, figs. 1-3, col. 1 lines 15-45, col. 2 lines 15- 60, col. 3 line s1-35, 49-67, col. 4 lines 25-65, col. 5 lines 1-35, and col. 6 lines 1-10, 30-35. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the illumination system comprising a radiation-production system that produces extreme ultraviolet radiation, wherein particles produced as a by-product of extreme ultraviolet radiation production move substantially in a particle-movement direction, and a radiation collection system that collects the extreme ultraviolet radiation, the radiation collection system being arranged to collect extreme ultraviolet radiation which radiates in a collection direction, the collection direction being substantially different from the particle movement direction in order to extend the life time of collector optics by reducing/eliminating the accumulation of debris on the collector optics as taught in Ahmad [6,881,971].

As per claims 2,9, Kandaka [6,590,959] in view of Ahmad [6,881,971] teaches all aspects of the claims except for explicitly stating the electric field substantially follows an axial direction of the radiation production system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the electrodes arranged in order for the electric field to substantially follow an axial direction of the

radiation production system, since it has been held that rearranging parts of an invention involves only routine skill in the art.

As per claims 4,11, Kandaka [6,590,959] in view of Ahmad [6,881,971] teaches all aspects of the claims except for explicitly stating at least one of the electrodes being substantially ring-shaped, and an axis of each ring shaped electrode substantially coincides with the axial direction of the radiation production system. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have at least one of the electrodes be substantially ring-shaped, and an axis of each ring shaped electrode substantially coincides with the axial direction of the radiation production system, since it has been held to be within the general skill of a worker in the art to select a known shape on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claims 5,12, Ahmad [6,881,971] teaches the radiation collection system having an optical axis substantially parallel to the axial direction of the radiation production system. See Ahmad [6,881,971] abstract, figs. 1-3, col. 1 lines 15-45, col. 2 lines 15- 60, col. 3 line s1-35, 49-67, col. 4 lines 25-65, col. 5 lines 1-35, and col. 6 lines 1-10, 30-35.

As per claims 7,14, Kandaka [6,590,959] teaches the radiation collection system comprises an optical system that provides the beam of radiation. See Kandaka [6,590,959] abstract, figs. 1,3-5.

Claims 1-3,6,9-10,13,16, are rejected under 35 U.S.C. 103(a) as being unpatentable over Kandaka [6,590,959] in view of Klebanoff [6,888,297]. As per claims

1,8,15, Kandaka [6,590,959] teaches an lithographic apparatus comprising an illumination system that provides a beam of radiation, a support structure (513) that supports a patterning structure (508), the patterning structure configured to impart the beam of radiation with a pattern in its cross section, a substrate support (514) that supports a substrate (511), and a projection system that projects the patterned beam onto a target portion of the substrate. See Kandaka [6,590,959] abstract, figs. 1,3-5. However, it does not explicitly state the illumination system comprising a radiation-production system that produces extreme ultraviolet radiation, wherein particles produced as a by-product of extreme ultraviolet radiation production move substantially in a particle-movement direction, and a radiation collection system that collects the extreme ultraviolet radiation, the radiation collection system being arranged to collect extreme ultraviolet radiation which radiates in a collection direction, the collection direction being substantially different from the particle movement direction. Klebanoff [6,888,297] does teach the illumination system comprising a radiation-production system that produces extreme ultraviolet radiation, wherein particles produced as a by-product of extreme ultraviolet radiation production move substantially in a particle-movement direction, and a radiation collection system that collects the extreme ultraviolet radiation, the radiation collection system being arranged to collect extreme ultraviolet radiation which radiates in a collection direction, the collection direction being substantially different from the particle movement direction. See Klebanoff [6,888,297] abstract, fig. 3, col. 2 lines 45-67, col. 3 lines 1-4,15-40,60-67, col. 4 lines 5-10, col. 44-67. Therefore, it would have been obvious to a person of ordinary skill in the art at the

time the invention was made to have the illumination system comprising a radiation-production system that produces extreme ultraviolet radiation, wherein particles produced as a by-product of extreme ultraviolet radiation production move substantially in a particle-movement direction, and a radiation collection system that collects the extreme ultraviolet radiation, the radiation collection system being arranged to collect extreme ultraviolet radiation which radiates in a collection direction, the collection direction being substantially different from the particle movement direction in order to extend the life time of collector optics by reducing/eliminating the accumulation of debris on the collector optics.

As per claims 2,9, Klebanoff [6,888,297] teaches the radiation production system comprises two oppositely chargeable electrodes that generate an electric field there between, and the electric field substantially follows an axial direction of the radiation production system. See Klebanoff [6,888,297] abstract, fig. 3, col. 2 lines 45-67, col. 3 lines 1-4, 15-40, 60-67, col. 4 lines 5-10, col. 44-67.

As per claims 3,10, Klebanoff [6,888,297] teaches the collection direction being a radial direction of the radiation production system. See Klebanoff [6,888,297] abstract, fig. 3, col. 2 lines 45-67, col. 3 lines 1-4, 15-40, 60-67, col. 4 lines 5-10, col. 44-67.

As per claims 6,13, Kandaka [6,590,959] teaches the radiation collection system has an optical axis substantially parallel to the radial direction of the radiation production system. See Kandaka [6,590,959] abstract, figs. 1,3-5.

As per claim 16, Klebanoff [6,888,297] teaches generating an electric field along the particle movement direction. See Klebanoff [6,888,297] abstract, fig. 3, col. 2 lines 45-67, col. 3 lines 1-4, 15-40, 60-67, col. 4 lines 5-10, col. 44-67.

Response to Arguments

Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 6,232,613 to Silfvast et al. is considered pertinent due to its discussion on a debris blocker/collector and emission enhancer for discharge sources.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. Quash
A.Q.
7/9/05

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800